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PITTSBURGH TECHNICAL HEALTH TRAINING INSTITUTE DEMONSTRATION PROJECT. FINAL REPORT, VOLUME I.

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DESCRIPTORS- *HEALTH OCCUPATIONS EDUCATION, *NURSES AIDES, *DEMONSTRATION PROJECTS, PRACTICAL NURSES, *JOB ANALYSIS, CORE CURRICULUM, TEACHER SEMINARS, CURRICULUM EVALUATION, *CURRICULUM DEVELOPMENT, TRAINING OBJECTIVES, STUDENT CHARACTERISTICS, MATERIAL DEVELOPMENT, CONTROL GROUPS, EXPERIMENTAL GROUPS, PROGRAM EVALUATION, COMPARATIVE ANALYSIS, SURGICAL TECHNICIANS,

THE PRINCIPAL PURPOSE OF THE PROJECT WAS TO DEVELOP A MODEL HEALTH OCCUPATIONS TRAINING PROGRAM. LISTS OF TASKS PERFORMED BY NURSE AIDES, PRACTICAL NURSES, AND SURGICAL TECHNICIANS WERE DEVELOPED THROUGH (1) INTERVIEWS WITH WORKERS AND JOB SPECIALISTS, (2) A STUDY OF HIRING REQUIREMENTS, JOB SPECIFICATIONS, AND DAILY ACTIVITY CHARTS, AND (3) OBSERVATIONS BY THE RESEARCH STAFF. THESE LISTS WERE RATED BY 954 WORKERS AND SUPERVISORS IN 43 AREA HEALTH SERVICE INSTITUTIONS. WORKERS RATED THE FREQUENCY OF PERFORMANCE AND SUPERVISORS THE CRITICALITY OF EACH TASK. TASKS REPORTED AS PERFORMED BY NO FEWER THAN 50 PERCENT OF THE WORKERS AND AS A FUNCTION OF THE WORKER BY NO FEWER THAN 50 PERCENT OF THE SUPERVISORS WERE ANALYZED. FROM THESE, 61 TASKS COMMON TO THE THREE OCCUPATIONS WERE USED AS THE BASIS OF THE CORE CURRICULUM. THE CURRICULUM WAS DEMONSTRATED IN A 6-WEEK NURSE AIDE TRAINING PROGRAM FOR 22 STUDENTS IN TWO GROUPS AS OPPOSED TO THE CONVENTIONAL 8 WEEKS. A HANDBOOK OF STEP-BY-STEP BASIC NURSING PROCEDURES, DEVELOPED DURING THE PREPARATORY STAGE, WAS UTILIZED AND FURTHER DEVELOPED DURING AND FOLLOWING THE COURSE. ON PERFORMANCE TESTS GROUPS IN THE DEMONSTRATION PROGRAM HAD A SIGNIFICANTLY HIGHER MEAN THAN THE 14 STUDENTS IN TWO CONTROL GROUPS IN THE 8-WEEK CONVENTIONAL PROGRAM, AND EXPERIMENTAL GROUPS' SCORES WERE CONSISTENTLY HIGH ON THE WRITTEN TESTS. IT WAS CONCLUDED THAT THE PROGRAM WAS SUCCESSFUL AND THAT THE MODEL IS SUITABLE AS A BASIC DESIGN FOR OTHER PARAMEDICAL TRAINING PROGRAMS. VOLUME II OF THE "FINAL REPORT" IS AVAILABLE AS VT 005 512. (JK)

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Final Report

Grant or Contract No. OEGI-6-062015-1839

Pittsburgh Technical Health Training Institute

Demonstration Project

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SUMMARY

Existing statistics point to a need on a nationwide scale for more untrained youth to be drawn into training programs which will prepare them for the health service field. This research project focused upon developing a model training program with all of its components so that future efforts in establishing training programs in the para-medical occupations in the Pittsburgh Public Schools might have a pattern to follow. The objectives were to test and demonstrate a flexible educational system, to innovate teaching methods, reorient teachers, and to begin to develop a physical plan which would house widely-scattered programs in one suitably equipped and staffed center.

The research effort itself consisted of six major phases. These were:

Phase I - Conducting Job Analyses for the Occupations of Nurse Aide, Practical Nurse, and Surgical Technician

Phase II - Determining Training Objectives from the Job Requirements

Phase III - Studying Characteristics by the Para-medical Student Body

Phase IV - Orienting the Health Institute Instructors to the Concept of a Flexible Educational System

Phase V - Developing the Demonstration Curriculum

Phase VI - Evaluating the Experimental Curriculum

Phase I

The main base upon which the research was built, and one found to be a strong base, was the job analyses. Through the job analyses the research team identified (1) the tasks performed by workers in actual job situations; (2) the specified procedures of task performance; and (3) the frequency with which a task was performed.

A preliminary step to the job analyses was the construction of technical behavior checklists which itemized all the tasks performed by the workers in the three occupations under study. (Appendix B) Information for these checklists was obtained from several sources: through interviews with workers and job specialists,

from hiring requirements and job specifications of area hospitals, through daily activity charts kept by persons on the various jobs, and through on-the-job observations by the research staff.

After being analyzed, the information was used to construct a job analysis check list for each of the three occupations -- Licensed Practical Nurse, Nurse Aide/Orderly, and Surgical Technician. One form was distributed to the individuals employed in these positions; the second, to their supervisors. The workers were asked to indicate the frequency with which they performed each task on a three-point scale ranging from "frequently" to "never". The supervisors were to rate the criticality of each task on a five-point scale ranging from "very important" to "not important" with a sixth point assigned to "not a function". (Appendix F) In addition the supervisors were to report in writing an example of each employee's typical job behavior. (Appendix D)

This survey was made of forty-three area hospitals and institutions. (Appendix E) The sample was composed of all available employed public school graduates of the nurse aide, practical nurse, and surgical technician programs of the past two years. Control groups were selected for each of the three experimental groups by choosing an equal number of individuals in each field who were employed in the same capacity by the participating hospitals but who had not received their training in the public school programs. Like their counterparts, these groups filled in the job analysis checklists, and their supervisors rated the criticality of the tasks and gave an example of each employee's typical job behavior.

Of the 1,174 forms distributed, 81.3 per cent was returned. Only two returns were excluded as invalid.

The checklist covering the practical nurse occupation contained 198 tasks, which grouped into eleven major categories; 198 tasks for nurse aide also were grouped into eleven categories; and the 136 tasks for the surgical technician were grouped into eight categories. For the practical nurses and nurse aides, there was strong agreement between the frequency with which they report performing a task and the supervisors' ratings of that task as part of their responsibilities. The relationship between frequency and criticality ratings for the surgical technician was less marked. (See Table V, page 28)

Phase II

The tasks reported as performed by no less than 50 per cent of the workers and judged by no less than 50 per cent of the registered nurse supervisors to be a function of the worker were analyzed. From these a pool of tasks common to all three para-medical occupations

was specified. Sixty-one were found to be basically common. (Appendix H) These 61 tasks, which constitute the trainee's end-of-program behaviors and beginning-of-job behaviors, provided the basis for specifying the educational objectives. The core curriculum was constructed from these. (Appendix G)

Phase III

Student characteristics that might affect success in training programs or on-the-job performances were examined. Data available on students who had entered the three relevant Pittsburgh Board of Education programs during the past two years were analyzed. For all three groups, the mean intelligence quotient was well within normal range. For detailed figures on student characteristics, see Table IX, on page 36.

Phase IV

Five in-service instructor seminars were given in an effort to orient instructors to the training philosophy and to acquaint them with the demonstration program's basic premise of activity-oriented, job-related materials and immediate reinforcement in learning. All five sessions were structured along these general lines: lecture by an authority, with illustration of material by visual aids; question-answer session; work-shop groups for discussion of the topic covered. Toward the end of the final session, a two-page questionnaire was distributed to those in attendance as a means of evaluating the benefits of and reactions to the seminars. The report of specific responses for each of the 17 questions is presented in Appendix N.

Phase V

Preliminary findings indicated that a curriculum which would reduce training time could be developed for para-medical occupations. A study of a conventional curriculum in use revealed that the first two weeks of training were being used to provide trainees with remedial reading and arithmetic, and to school them in such topics as cleanliness, personal grooming, and proper diet. This introductory phase appeared to be not essential to an experimental curriculum based on the Pearl and Riessman (27) approach for teaching those on the lower socioeconomic level, i.e.: (1) continuous on-the-job training and almost immediate initiation to work and (2) an activity rather than a lecture method.

Of the three occupations studied, the nurse aide program appeared to be the one which could best be developed, demonstrated and evaluated for establishing a model curriculum. For that reason, the curriculum was demonstrated in a training program for nurse aides.

In designing and correlating the pilot program, the research staff developed unit quizzes, examinations, worksheets, progress records, daily lesson plans and an overall schedule. The quizzes were given in class, graded immediately by the students themselves, and then discussed in class with the instructors. (Appendix O) Three written examinations were given at specified times during the six-weeks course, each was a test of the students' comprehension of the material taught them in the immediately preceding period. (Appendix P) Some of the worksheets were developed for units where maximum transfer could be expected, i.e., in conditions similar to actual on-the-job performance. (Appendix Q) The skills to be mastered were listed in the progress records and when successfully performed by the student were checked in his presence by the instructor. (Appendix R) The daily lesson plans were provided to the instructors well in advance of the day for which each lesson was scheduled. These lesson plans specified the objectives, visual aids to be used, homework assignments, form of evaluation, and the type of presentation (roleplay, demonstration, group discussion, lecture, supervised clinical work). See Appendix S. The sequence of lessons, visual aids, worksheets, tests, quizzes, and homework assignments were outlined in the overall schedule which was intended for use by the instructors as a master plan. The curriculum was designed to have maximum appeal for the designated type of student in training.

The development of a Nurse Aide Handbook was a major undertaking in the preparatory stages of the curriculum. The 172 page handbook was written and edited in step-by-step procedures of basic nursing procedures, including instructions for the performance of tasks which were designated by the job analysis survey as those most often performed by nurse aides in area institutions. About one hundred and fifty illustrations were used. This handbook, titled Basic Care of the Patient, was provided the instructors and the trainees for use as a textbook during the six-weeks course. The instructors were asked to make critical notations of the handbook as they used it whenever they thought the material ought to be enlarged, changed, omitted, or in any other way revised to meet the learning needs of the students. When, after the end of the six-weeks course, all the points of change had been discussed and compiled, the handbook was revised.

From the typical job-behavior information requested of supervisors, the research staff edited thirty of the true incident cases reported as having been encountered by nurse aides in area institutions. With names deleted, the incidents were assembled into a booklet titled True Cases of Nurse Aide Techniques. (Appendix U) The booklet was distributed to trainee graduates of the experimental curriculum after they had been on their jobs for approximately two months.

Description of Sample:

For the demonstration program, two training classes comprised of two sections each constituted the sample used. Each trainee was recruited in the customary manner by the Pennsylvania State Employment Service and was assigned at random to one of four classes in two area hospitals. Twenty-three enrolled in the conventional training course, which began June 6, 1967. Of these, nine dropped out. Thirty enrolled in the experimental training course, which began July 16, 1967. Of these, eight dropped out.

The conventional course was the usual eight-week training period with final evaluation by the written conventional examination scheduled for the eighth week. These were the control groups, divided into two classes of six and eight students. The experimental groups were trained by the experimental curriculum with final evaluation of the students in the sixth week by the newly developed examination. These were comprised of two classes of eleven students each.

As a sampling of nurse aide graduates of local training programs, the students in the control and experimental groups were found to be quite representative. They also, for the most part, were of the lower socioeconomic order. (See Table X, page 49)

Phase VI

In evaluating the nurse aide demonstration program, four different quantitative measurements were used: performance tests, three written examinations, student on-the-job evaluations, and supervisor on-the-job evaluations. In addition, the instructors applied their personal judgments as to whether or not the students were sufficiently trained at the end of six weeks to begin nurse aide work.

The performance test consisted of simulated on-the-job performances of selected nurse aide procedures, and were administered to the trainees of both the control and experimental groups toward the end of their respective training periods. (Appendix V)

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Results

On Performance Tests the experimental groups had a significantly higher mean than had the control groups. Out of a possible 70 points, the combined mean for the experimental groups was 62.73; for the control groups it was 52.57. The superiority of the experimental groups was further indicated by the fact that no person in the control groups had as high a score as the mean score of the experimental groups. There was a low negative correlation (-.08) between I.Q. and performance on the test scores.

In all ten sub-areas of the performance test, differences in the percentages of correct responses between the experimental and control groups of both hospitals were found consistently higher in the experimental groups than in the control groups. In two techniques, the experimental groups' percentages were consistently higher. The experimental groups at both hospitals achieved a high proficiency level of 97 per cent in hand-washing. This compared with 64 per cent, or an unacceptable level of proficiency, for the control group at Hospital No. 1 and 73 per cent at Hospital No. 2. In the technique of taking respirations, at Hospital No. 1 the experimental group's 91 per cent compared with the control groups' 78 per cent. At Hospital No. 2, the perfect score of 100 per cent compared with the control group's 70 per cent, or minimal acceptable level of proficiency. The one other 100 per cent score of an experimental group was in admission and discharge, at Hospital No. 2. This compared with the control group's unacceptable level of proficiency at 58 per cent. The specific percentages are presented in Table XI, on page 44.

2. Student average scores on the three written examinations of the experimental curriculum were consistently high. At Hospital No. 1 the mean score was 90.63. At Hospital No. 2 the mean score was 88.5. Out of a possible score of 100, the lowest score registered by an individual was 77.

3. On-the-job evaluations by the trainee graduates of the experimental curriculum revealed that within the two months the trainee graduates had been on the job, only three of the tasks on the checklist had not been performed by any of the nurse aides. Seventy-one per cent of the tasks were reported to have been performed by more than one half of the graduate trainees. (See page 54)

4. On-the-job evaluations of the trainee graduates by the registered nurses who were their supervisors showed no significant differences among the four groups as evaluated on the nine-point behavioral rating scale. (See page 55)

The teacher evaluations resulted in a sharp split* as to whether or not the trainees were adequately trained at the suggested six weeks termination date. At Hospital No. 1, the two instructors refused to terminate any of the trainees, saying that none was sufficiently trained in the two procedures of taking temperature-pulse-respiration, and administering enemas. At Hospital No. 2 the four instructors reported all the students sufficiently trained in all the taught procedures to be placed in nurse aide work at the end of the six weeks.

Conclusions: It is a reasonable conclusion that the program was successful in reducing the training time and producing performances equal to or better than matched groups.

This result suggests that the model for curriculum construction is suitable as a basic design from which other para-medical training programs may be developed. It is believed that to achieve the same gains, the model must be followed in all its major aspects: job analyses -- to determine tasks actually performed on the job; study of trainee characteristics -- to determine the training methods needed; in-service seminars -- to maximize the quality of instruction; and multiple evaluations -- to ascertain the effectiveness of the training.

The job analyses appears to be the most objective and most effective way to arrive at job descriptions for purposes of curriculum building. It eliminates personal biases and individual preferences which can be caused by the specific job procedures of an institution. The emphasis on task performance is believed to have been vital in reducing the time required for training nurse aides by 25 per cent with any reduction in the effectiveness of training, as measured by performance tests.

Another factor believed to have been significant in the program's success is the focus on trainee characteristics, and the subsequent choice of methods and materials appropriate to activity-oriented trainees who value manual skills and like immediate gratification. They responded well to the methods and materials which had been chosen to motivate them.

In-service instructor seminars for training programs of this nature are essential, inasmuch as teaching involves continual refinements of approach which must be adopted to the specific program. The use of visual aids, for instance, needs careful explaining to in-

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*An administrative difficulty encountered was a pronounced bias against any reduction in curriculum.

structors if the aids are to be successfully integrated into a curriculum.

It appears that the best evaluative tool for demonstration programs of this type is performance tests. Since "an individual learns that which he does" (20), performance has the added importance of serving as a strong teaching aid.

On-the-job evaluations by the trainee graduates indicate whether or not the curriculum adequately prepared the trainees for their work, and serve as a guide for possible curriculum revisions.

The commonalities among the three para-medical occupations studied were found to warrant the development of a core curriculum. This core may well serve as a format for a general introductory course in at least the three fields investigated. As such, the first two weeks of the curriculum could constitute the first two weeks of a general para-medical course. This introductory training would allow students a chance to acquire a knowledge basic to all three occupations before they make their occupational choice. After the two-week period, students who chose to become surgical technicians would move into the surgical technician program. Those in nurse aide or in practical nurse training could continue together in the common program for an additional month, at which time those qualifying for practical nurse training could be enrolled in the practical nurse program. This would be a departure from the traditional training programs in that trainees are not immediately locked into a specific course; they would be given an opportunity to move into related training courses without having to start training afresh.

Acceptance of these enrollees was something less than universal in view of their reduced training program. This suggests that a problem may exist in the acceptance of any para-professional medical personnel who are trained in any program outside of the conventional. This could provide a formidable barrier to innovative programs -- especially those requiring licensure and/or certification for employment.

INTRODUCTION

For years there has been a recognized shortage of professional workers and professional aides in the health service field. In many areas the shortages have become cause for serious concern, and projections in the realm of national requirements point to even larger needs. It is estimated that to meet those needs of the nation up through 1975, the health community must realize an increase of one million employees above the present total of three million employees in all the health occupations. In the words of Francis Keppel, Assistant Secretary for Education, Department of Health, Education and Welfare, "There is an arresting demand to develop an average of nearly 10,000 new jobs per month in the health services alone." (15)

That so much expansion is being required of the health service field can be attributed to at least a half dozen major reasons. The U. S. Department of Education has stated that the demand for medical and health services is rising considerably faster than the nation's total population. The demand is partly caused by the rapid growth in the number of children and old people, -- age groups which have the greatest need for medical care. Also given as significant contributing reasons are new environmental health hazards, the greater urbanization of the population, the marked expansion in medical research, the extension of hospital and insurance plans, and the increased use of technological devices for diagnosis and treatment. A government-sponsored conference in 1966 (3) concluded that there must be more Federal funds allocated for research and demonstration programs in the health service occupation training programs and that there must be an expansion of training programs in the field. It was also suggested at this conference that the unemployed and underemployed constitute a potential source of manpower for entry jobs in the health service industry.

Though the national economy is characterized by record high levels of employment, it is common knowledge that many pockets of unemployment exist. Unemployment rates are highest for workers of low skill or low educational attainment, workers whose job opportunities have been curtailed by automation and other technological changes. Young people who have entered the labor force with inadequate education have had high unemployment. The health field with its growing manpower needs can be a welcome and satisfying source of employment for them.

This fact is of particular significance to demonstration programs, such as the Pittsburgh Technical Health Training Institute Demonstration Project, which have the general goal of helping to provide an adequate supply of paramedical workers equipped with the proper skills for use when and where needed. The most imperative need in the health service field is the need for auxiliary personnel whose preparation programs fall below the baccalaureate level.

As stated by Mr. Keppel, "It is not that we can be complacent about the numbers in professional training, but... Of more immediate and crucial need is the development of the supportive health workers who must fill the chinks between the professionals." (15)

A decisive factor in this immediate need for supportive health workers is the massive growth currently taking place in the number and capacity of nursing homes. By 1975, the number of nursing home beds is expected to more than double, with employment far exceeding the 1965 level of 250,000. (23) Since nursing-home workers tend to be those with skills concentrated at the lower end of the skill ladder, the growth of this segment of the industry helps explain the more pressing need for nurse aides, attendants, practical nurses and other auxiliary personnel. Literally thousands of nursing homes are now and will be required to recruit licensed practical nurses and nurse aides at a time when educational and training facilities are already hard pressed to provide the personnel for these categories.

Also bearing upon this aspect of the problem is a basic trend of the health service industry to use more and more nonprofessional workers in patient care. Published figures (23) reveal that between 1950 and 1960, the greatest employment gain in nursing occupations was at the lower end of the skill ladder---a 90 percent gain in the employment of nurse aides, orderlies, and attendants. In the same ten-year period, employment of licensed practical nurses in hospitals rose by 50 percent, while only about 33 percent increase was shown in the most skilled category, that of registered nurses.

Those figures reflect not just the shortages of registered nurses but, to some extent, changes in technology, and efforts by hospitals and other health institutions to relieve professional employees of routine duties which can be performed by workers in the lower skill ranges.

In commenting upon this aspect of change in the health service field, Dr. Philip D. Bonnet, president of the American Hospital Association, quoted these figures from the most recent national study of nursing made by the Surgeon General's Consultant Group in 1962: approximately 550,000 registered nurses, 225,000 practical nurses, and 400,000 nurse aides are employed in United States hospitals and allied health institutions. (3) He added: "One must remember that no matter what the facts of the situation are right now, they would undoubtedly have been much worse had it not been for the vigorous efforts of nurses and hospitals to train and utilize a type of supportive nursing personnel, the nursing aide. Without the 400,000

of them in our hospitals, the situation would be worse than it is. The use of large number of practical nurses, 225,000, in addition to nursing aides, nearing half a million, underline response to changed requirements of the nursing profession. We hear pleas for a return to the good old days when the nurse was a bedside nurse and did everything for the patient and the physician. But those days have gone and will not return."

Although there may be differences of opinion about the distinctions of duties, and the roles and responsibilities of health service workers, it is evident that demands on paramedical workers are, and will continue to be, much greater than in the past. This means that special efforts must be made to maintain and improve both the quality and the number of workers in these fields. With long-term apprenticeship unattractive to the young person of today, the focus of demonstration programs such as this one should be on training paramedical workers to maximum levels of proficiency within the least possible time. In summary, this project was designed to demonstrate and evaluate a method to help fill the present shortages of paramedical workers with well-trained competent people, and provide a career ladder for those among them with the capabilities for upgrading themselves into positions requiring greater degrees of responsibility and technological skills.

Background and Related Research

Both at national and local levels, surveys have identified job classifications for which workers in health field are in clear need. Contributing to these enlarging needs are the fundamental points of (1) continuing and dramatic population growth and (2) the increasing national expenditures for health services. Considered on a projectional basis, they are of critical significance. By 1975, it is expected that the U.S. population will have increased by 31 million. This means adding health services each year for the equivalent of the city of Los Angeles or three times the city of Boston. (35) By 1980, it is estimated that the percent of the gross national product expended for health services will reach 8.7 percent, which compares with the present figure of 5.9 percent or in plain dollar terms 40 billion dollars a year. (35)

Also of major consideration is the inner change which has taken place in health care. During the last 40 years, health care has evolved from one-and-one relationship, that of doctor-and-patient to a complex medical team. (21) For example: admission to a hospital today for a routine physical examination can entail the services of ten

or more employees--nurse aide, student nurse, practical nurse, registered nurse, orderly, ward clerk, x-ray technician, laboratory technician and doctor. Today and in the future, education and training systems in health service must help produce persons qualified to assume responsibility within a broad occupational spectrum. Seen as a continuum running from an Aide level, the spectrum is: Aide level to Practical Assistant level to Technician level to Professional level. (16)

Within that broad spectrum are changeable and changing functions. Today, even the nurse aide's job has become complex to the point that pre-employment training is highly desirable. (28) The American Nurses' Association, in a statement released in September of 1965, (28) emphasized the need for the educational system to recognize this change and to establish programs that would provide pre-employment training and an introduction to that area of work. Thus the movement from on-the-job training to re-employment training has come to be the accepted vehicle to employment in our health institutions. During World War II, much was learned about systematic approaches to short-term intensive technical training. Many of these concepts can be applied to the training of para-professional personnel in the health field. Such a health training concept in Western Pennsylvania had its beginning in 1949 when hospitals and educators in Pittsburgh developed a successful pattern of training practical nurses. This was the first formal para-medical training program to be offered in a public school in this area. Since then, hospitals and educators have initiated many more health training programs to meet the identifiable manpower needs (i. e., those job categories defined by the United States Office of Education as occupations that render supportive services to the health professions). Over the last eighteen years these programs have graduated more than 2, 700 students trained in health related occupations, such as Licensed Practical Nurse, Nurse Aide/ Orderly, Certified Laboratory Assistant, Surgical Technician, and Food Service Supervisor.

Ten different health training programs are now being offered, with a current enrollment of 298 students. Developed through a cooperative effort of the Pittsburgh Board of Public Education, Hospital Council of Western Pennsylvania, Pennsylvania State Employment Service and other community agencies, all the programs are supported largely through the Manpower Development and Training Act (P. L. 87-405) and the Pennsylvania Retraining Act (P. L. 2508. 3). However, these efforts are not sufficient to fill even the community's present needs, and when future needs are considered it is clear that present efforts will have to be multiplied several times.

Presently, there is a shortage of several thousand health service workers in the Pittsburgh Metropolitan Statistical Area. In 1965, the Pittsburgh Board of Public Education with the support of a grant from the Pennsylvania Department of Public Instruction, began a study of the shortage and the possible ways of solving it. The research staff undertook a survey of community personnel needs in the health service occupations as projected up to 1970, and made a study of the feasibility of establishing a comprehensive health training center---a centralized facility which would produce more and better qualified health workers in a more efficient manner. (29) This study was completed in July, 1966. Additional funds were then granted by the U.S. Office of Education for the continuation of the research through the next 18 months. The research goals were concerned with defining output goals based upon community need, establishing occupational specifications, developing curricula and designing a comprehensive educational approach for the training center. When completed, the center will offer occupational training programs at high school and post high school levels. It is anticipated that some of the more unsophisticated programs will be as short as six weeks in length while others will be two years or more in duration. In short, it is hoped that the scope of the Institute will encompass all of those health-oriented skills requiring a preparation program of less than an Associate of Arts degree. The building which is being constructed for the Health Training Institute is well under way, with a projected completion date of June, 1968. Upon completion, the Institute will house training facilities for these health service courses: practical nurse, surgical technician, obstetrical technician, dental laboratory assistant, dental laboratory technician, and nurse aide/orderly. As such it will partially fulfill the goal of creating 500 new health training centers called for by the Secretary of Health, Education and Welfare, to provide America with an additional 100,000 trained paramedical workers annually.

At the community level, the findings of the need survey (1966) were in general agreement with those reported by other surveys, including the national survey (1966), conducted by the American Hospital Association. With such statistical support, a decision was made to select three related occupational roles in which the identified need was great so that commonalities could be determined and a model paramedical program developed. These were found to be the practical nurse, nurse aide, and surgical technician programs.

The necessary rationale for curriculum development in this area of health training was delineated; the schematic representation is given in Appendix A. It was decided that this rationale

would be followed to determine the educational objectives for the three selected health training programs, and that the entire curriculum development process would be demonstrated, using the Nurse Aide program as a model. The Nurse Aide program was chosen as the demonstration program because, of the three occupations studied, it appeared to be the one which could best be developed, demonstrated and thoroughly evaluated for establishing a model curriculum. The choice also was highly motivated by the increasing attention to the training of nonprofessional workers in the nursing occupation and the changing role of the professional nurse practitioner. In the past, as has been pointed out, "on-the-job training has largely consisted of helping the nonprofessional worker learn the job in somewhat the same fashion in which Topsy grew." (19) A continuing change in the functions and complexity of the individual nursing service has brought a distinct upgrading of nurse aide duties since the "new" Nursing Aide Project of 1954. Sponsored by the National League for Nursing, the American Hospital Association and the United States Public Health Service, the 1954 program basically trained the nonprofessional worker to perform relatively simple nursing duties. (32) Their tasks were generally of the type described by Dr. Mildred L. Montag as simple functions based on common knowledge. (23) However, within the last ten years, the tasks of the nurse aide have expanded in scope because of heavier demands on the time and skills of the professional nurse. Today, nurse aide's work can and sometimes does overlap into the area of what Dr. Montag identifies as intermediate functions which require skill and some judgment.

Stated more recently in another way: "As the responsibilities of the professional nurse have increased, practical nurses and aides have been recruited to assist the nurse... Nursing aides, who usually have limited on-the-job training only, are widely used to supplement the services of professional and practical nurses. They can perform many routine and less exacting functions well. However, the rapid increase in auxiliary workers and their use for many tasks that are beyond their competence pose a serious threat to the quality of nursing service. Aides must be properly instructed and supervised. Professional nurses, by and large have not had the time and skill for such teaching and supervision." (7)

Other influences in the selection of the Nurse Aide program for the testing program were these:

(1) More limited nursing-home budgets mean that fewer professional nurses can be hired, which heightens the need for more adequately trained nursing assistants at the sub-professional level. (11)

(2) Nurse aides represent the largest segment of nursing service personnel. (26)

(3) The high cost of training programs is a factor in the increased cost of patient care. (1)

Of definite consideration, as well, was the long-range possibility of introducing nurse aide training into the secondary educational system beginning at the 11th grade level. This would bear upon school dropout tendency which was estimated at 1,200,000 in 1965. (10) It is estimated that 40 per cent of the youths who dropped out of school in 1961 were from families whose annual income was less than $3,000, the level of poverty. Half the dropouts had left school in the second or third year of high school. (5)

Yet studies made of disadvantaged students have revealed that they "are capable of working well and hard on a specific task or assignment which has a purpose for them; for example, taking courses which will result in a job...leading to a career." (6)

Providing special classes for such students to give them "the remedial help they need to acquire some basic occupational skills" has been cited as a prime way to help alleviate school dropouts. (14) A connective benefit, in trying to direct potential school dropouts into a useful health service career, could well be an encouraging increase in the number of high school girl graduates going into nursing. Since 1959, their number has stood at 5 per cent annual, a decline from 6-7 per cent of the 1950's. (14) Altogether, both the needs of the health service field and the means to full them are clear-cut; and the service of research obviously lies in determining the fast, effective way of training formerly unguided youth into vocational usefulness and competence.

Objectives

As has been indicated in the previous pages, both facts and opinions point up a need for research which is directed at drawing more youth into the paramedical field. The general objective of this project was to help meet the nation-wide need for more trained personnel in the health service occupations by developing a mold for short-term health training programs. Throughout the project, research efforts centered upon the training of the paramedical worker who, already in short supply, is seen to be of increasing importance in the highly inter-dependent structure of the modern medical and nursing team.

In attempting to help meet the nation's heightened and growing need, the project has as its main effort a model program to demonstrate a more efficient method of training qualified paramedical workers, i.e., to test and demonstrate in a pilot program the feasibility, economic soundness, and educational benefits of a broad concept for training in health service occupations.

These subsidiary objectives as stated in the proposal of November, 1966, were identified as requirements which had to be met in order that the main objective could be realized.

1. To test and demonstrate a dynamic and flexible educational system for health service occupational training, and establish a basis for measuring results both quantitatively and qualitatively.

2. To innovate teaching methods--programmed instruction, closed circuit television, behavioral-oriented training, simulation of work environment--to develop curricula for the comprehensive health training institute.

3. To provide for the required reorientation and developmental training of teachers required for this and similar health training facilities.

4. To begin to develop an effective phsyical plan for an educational facility for training in the health service occupations, through unification of existing widely-scattered programs in one suitably equipped and staffed center.

If these four points were achieved, it was expected that the instruction of potential paramedical workers could be accelerated without loss of quality in the performance of their basic tasks, and that the training techniques would be useful guides to the paramedical fields on a wide basis.

A correlative aim was uniformity of learning. The importance of well-planned and well-structured teaching programs is stressed by Jensen (25), and Rines points out the need to plan and order experiences to insure that each new task incorporates previous learning. (4) With accelerated learning as one goal, the demonstration program also had its material structured and sequenced so as to effect the uniform rate of learning desired. This entailed an emphasis on performance for evaluative purposes, which bears upon the consistent effort to judge the program by its individual parts as well as by its realized whole.

Thorndike, Hull and Skinner all based their entire systematic thinking of the proposition that without performance there is no learning, (20) and McGehee and Thayer state that "we do not know whether an individual has learned until he has performed... Certainly, any training method which does not provide ample opportunity for the trainee to perform allows little opportunity for the trainer to determine what the trainee has learned." (13)

It was anticipated that, as a job preparation, the demonstration program would help a portion of socio-economically handicapped youth into a knowledge of not only how to get a job, but how to hold a job, and to progress in it, and to transfer from one job to another---concepts which have been cited as challenges to vocational education. (30)

Another hoped for aspect of the program in its possible wider application was that it would acquaint the trainee with the attitude and conduct expected of employees on the job, including the ability to get along with one's fellow workers. In selecting the learning experiences, an attempt was made to point out desirable behaviors which can be helpful to the trainee in meeting more than the basic obligations of his or her future paramedical work.

The overall objectives for this project were in accordance with the guide suggested by Holmquist, specifically that objectives should be selected in terms of (a) importance and significance, (b) possibility of an attainment, and (c) consistency. (14)

Methods and Results

The philosophy governing the design of the curriculum rationale is that the three main factors which contribute to training, i.e., the subject material, the media and methods, and the students must all be studied and their potentials stimulated to the maximum levels in order to achieve optimum learning effect. The decision as to what training technique to employ was made after careful analyses of the three selected health service occupations, the information to be transmitted, the abilities of the personnel to be trained, and the behavior to be mastered.

The research effort consisted of six major phases. Some phases could be worked on concurrently; in other instances the phases were accomplished in sequence. The job analysis, for instance, had to be completed before training objectives could be specified. Whenever possible in this section, the order of the actual research work is followed. The phases will be presented separately and will include both the methodologies utilized and the results obtained. They are as follows:

Phase I - Conducting Job Analyses for the Occupations of Nurse Aide, Practical Nurse and Surgical Technician

Phase II - Determining Training Objectives from the Job Requirements

Phase III - Studying Characteristics of the Paramedical Student Body

Phase IV - Orienting the Health Institute Instructors to the Concept of a Flexible Educational System

Phase V - Developing the Demonstration Curriculum

Phase VI - Evaluating the Experimental Curriculum

PHASE I

Conducting Job Analyses for the Occupations

of

Nurse Aide, Practical Nurse, and Surgical Technician

METHODS

The research effort focused upon analyses of three health service occupations--practical nurse, nurse aide and surgical technician--in order to determine commonalities among their training requirements. The three paramedical professions used throughout this report are defined as follows:

> Practical Nurse - a person trained and employed to assist in the care of patients under the direction of physicians and/or registered nurses in performing tasks which require technical knowledge but not the professional training of a registered nurse.
>
> Nurse Aide, also Nursing Aide - a person trained and employed to perform tasks which assist the nurse in nursing and non-nursing functions.
>
> Surgical Technician - a person trained and employed to perform combinations of assigned tasks before, during, and after the operation of a patient.

The first step in this phase was the collection of the information necessary for the job analyses. Then job analysis checklists which itemized all the tasks performed by the workers in each of the three occupations, were constructed. (A sample checklist is in Appendix B) To insure that the checklists were sufficiently comprehensive, the information for them was obtained from several sources: workers and job specialists were interviewed, hiring requirements and job specifications were secured from area hospitals, and licensure requirements for licensed practical nurses were examined. Daily activity charts kept by persons on the various jobs were a primary source of information in the development of performance inventory forms. (Appendix C) These forms were constructed for use by the research team in recording systematic, on-the-job observations of surgical technicians, practical nurses, and nurse aides.

One hundred observations were made for each occupation. These five-minute observations were carried out in large, small, and medium sized hospitals. Each observer wrote a detailed step-by-step account of what the worker did on his job during the five minutes he was being observed. Systematic observations were made of practical nurses and nurse aides, and surgical technicians in a variety of work assignments. The contents of these observations then was analyzed and the data used to insure comprehensiveness of the job analysis checklists as well as to provide detailed guidelines for basic nursing procedures.

One form of each checklist was distributed to the individuals employed in these positions, and a second form was distributed to their supervisors. These two forms consisted of the same items, but the directions were slightly different. The workers were asked to indicate on the checklist the frequency with which they performed each task by checking a three-point scale ranging from "frequently" to "never". The supervisors were asked to rate the criticality of each task on a five-point scale ranging from "very important" to "not important", with a sixth and final point assigned to "not a function". Thus, for each task it was possible to determine the frequency with which the task was performed by the employees and the relative importance of each task as judged by the supervisors.

Supervisors were requested to provide one additional type of information; they were asked to report in writing an example of what they considered the typical job behavior of each employee. (Appendix D) These data were collected using an adaption of the Critical Incident Technique developed by Flanagan. (12)

Each participant received a packet consisting of the appropriate technical behavior checklist, a description of the purpose of the instrument, and a memorandum from the Assistant Superintendent for Occupational, Vocational, and Technical Education urging the recipient's cooperation. They were instructed to return the completed data in the stamped, self-addressed envelope provided. These packets were distributed through the nursing services of the forty-three participating area hospitals and institutions.

Sample: The sample was composed of graduates of the public school program in the area. The experimental groups included all available employed graduates of the nurse aide, practical nurse, and surgical technician programs of the past two years. Because forty-three institutions had employed the graduates, it was possible to obtain subjects from a representative group of area health service institutions. (Appendix E)

Control groups were selected for each of the three experimental groups by choosing an equal number of individuals in each field who had not received training in the public school program but who were employed in the same capacity by the participating hospitals. Like the experimental groups, these controls groups completed the appropriate job analysis checklist. Also like their counterparts in the experimental sections, the nurse supervisors of these workers were asked to complete the supervisors' form of the job analysis checklist to rate the criticality of the tasks, and to report in writing an example of each employee's typical behavior on the job.

Results: The cooperation of the participants was impressive. Of the 1,174 forms distributed, 81.3 per cent was returned. Such a high rate of return is most unusual in surveys of this type and is particularly impressive in view of the time and effort required by a respondent to complete the checklist. Only two returns were excluded as invalid.

The request made of the workers' supervisors to report in writing an example of each employee's typical behavior on the job provided more than insight into the supervisors' impressions of the workers' abilities and attitudes. The reports, when studied, were seen to provide a small rich field of true incidents in the techniques of caring for patients, cooperating with fellow workers and superiors, and in the performance of hospital duties generally.

A concentrated effort of the study was on the incidents reported by the supervisors of nurse aides. Of the 140 incidents reported, a total of 108 was grouped into six main categories of a positive nature, such as Responsibility in Reporting to Nurse, or Skill in Nursing Care. A total of 21 negative incidents was reported, but for the most part the negative incidents were one of a kind and did not lend themselves to being categorized. The percentage in each positive category is given in Table I, as follows.

TABLE I

The main categories derived from supervisors' reports of incidents of typical behavior:

Responsibility in Reporting to Nurse	25%
Skill in Interpersonal Relations	24%
Initiative	21%
Skill in Nursing Care	12%
Cooperative	9%
Good Judgment	8%

For the data analysis, weights were assigned to the frequency ratings and the criticality ratings. In the case of the frequency ratings made by the worker, a value of one was assigned to the rating "frequently", two to the rating "often", and three to the rating "never". The criticality ratings were scaled similarily: a value of one was assigned to a rating of "very important", a value of five to a rating of "not important", with intermediate ratings receiving values of two, three, and four.

A value of six was assigned to "not a function". Thus, the lower the mean frequency rating of a task, the more frequently it was reported as being performed by the worker. The lower the mean criticality rating of an item, the more critical the supervisors felt the task was. Item means, standard deviations, and the frequency distribution of the responses by item were then calculated for each task.

Because the two different populations responded to different types of rating scales, it was necessary to transform the data to comparable units before proceeding with the data analysis. This was done by using a Z-score transformation. The effects of the different scale ranges were thus eliminated.

In order to derive an index to be used in establishing the relative emphasis each task would receive in the planned curriculum, the Z-score of each task on the frequency ratings and the criticality ratings were combined in an appropriate fashion. It was deemed best to weigh these two factors equally; therefore, the Z-scores were added to determine the index figure for that task. The results obtained first from using the item Z-scores for both frequency and criticality and then by summing the two Z-scores of each item into an index are presented in Appendix F.

The job analysis check list covering the licensed practical nurse occupation contained 198 separate tasks, grouped into eleven major categories. For each of the items, the percentage of supervisors who indicated the task is one to be performed by the practical nurse was calculated as was the percentage of practical nurses who reported performing each of the tasks. From these data, the mean percentage of the items in each of the eleven groups was calculated for both supervisors and practical nurses. The categories then were ranked on the basis of these separate mean percentages.

A rank order correlation coefficient .87 was obtained between these two sets of rankings. This value, significant at greater than the .01 level, indicated a strong degree of agreement between the frequency with which practical nurses report performing a category of tasks and the supervisors' ratings of that task as part of the practical nurse's responsibility. The separate mean percentages are presented in Table II, on the following page.

TABLE II

Practical Nurse Category Percentages

CATEGORIES	Mean Percentage for Category of Tasks as Rated by -- Registered Nurse	Licensed Practical Nurse
Position and Transport Patients	95.7%	97.38%
Patient Comfort and Personal Service	89.74%	87.79%
Treatments	75.54%	69.05%
Measuring-Gathering Recording-Reporting Data	78.79%	70.16%
Unit Operations	66.07%	69.33%
Teaching-Relating Information	54.96%	60.12%
Surgical Procedures	51.98%	31.01%
Food Service	51.01%	56.33%
Set Up, Operate, and Service Equipment	49.44%	48.69%
Medications	37.82%	37.74%
Housekeeping	29.%	44.03%

The procedure described for the pratical nurse occupation also was carried out for the 198 items included in the nurse aide check-list. These items were grouped into eleven categories and a similar analysis performed. The correlation coefficient between the two sets of rankings for this group was .95, a value significant at greater than the .01 level. The separate mean percentages are presented in Table III, on the following page.

TABLE III

Nurse Aide Category Percentages

CATEGORIES	Mean Percentages for Category of Tasks as Rated by - Registered Nurse	Nurse Aide
Patient Comfort and Personal Service	80.29%	80.92%
Position and Transport Patients	74.00%	91.00%
Unit Operations	52.90%	60.00%
Measuring-Gathering Recording-Reporting Data	50.50%	56.60%
Housekeeping	48.30%	55.30%
Teaching-Relating Information	44.70%	39.70%
Set-Up, Operate, and Service Equipment	36.30%	29.90%
Treatments	35.60%	34.30%
Food Service	33.40%	37.00%
Surgical Procedures	23.70%	19.00%
Medications	10.90%	6.50%

As with the checklists for practical nurses and nurse aides, the 136 tasks included in the surgical technician instrument were grouped; these fell into eight categories. The mean percentages were then calculated. The rankings on the two sets of mean percentages yielded a correlation coefficient of .78, which was significant at greater than the .05 level. The percentages are as designated in Table IV, as follows:

TABLE IV

Surgical Technician Category Percentages

CATEGORIES	Mean Percentages for Category of Tasks as Rated by - Registered Nurse	Surgical Technician
Obtaining Equipment and Supplies	82.9%	96.3%
Medical-Surgical	80.7%	92.5%
Assembling Equipment and Supplies	80.5%	98.1%
Position and Transport Patients	78.1%	91.6%
Maintaining Equipment and Supplies	75.6%	92.8%
Requesting Equipment and Supplies	73.5%	92.2%
Administrative - Clerical	73.4%	85.6%
Housekeeping	61.8%	79.5%

The relationships between the supervisors' criticality ratings and the workers' frequency ratings for the tasks were determined for each of the three occupations. This was done through use of the Pearson Product Moment correlation. As shown in Table V, below, each of the three correlations was significant at greater than the .01 level. The correlation for practical nurses and nurse aides indicates a greater relationship between criticality and frequency ratings than does the one for surgical technicians.

TABLE V

Correlations Between Criticality and Frequency

	Correlation
Practical Nurse (N=198 Tasks)	.83 **
Nurse Aide (N=198 Tasks)	.82 **
Surgical Technician (N=136 Tasks)	.27 *

** P = $<$.001
* P = $<$.01

PHASE II

Determining the Training Objectives

from

Job Requirements

METHOD

The tasks reported as performed by no less than fifty per cent of the workers and judged by no less than fifty per cent of the registered nurse supervisors to be a function of the worker were analyzed. These tasks were reported into three categories, depending upon whether the task was related more closely to people, data, or things.

Of the total 198 tasks on the practical nurse checklist, 60 met the cut-off criterion. In the same total number of nurse aide tasks, 41 per cent met the criterion. The percentages arrived at in sorting these tasks into the three described categories are listed in Table VI, as shown below. As shown in the table, the distribution of the tasks of the two occupations across the three categories differs considerably ($x^2 = 5.87$; $df = 2$; $.10^{P}.05$). The practical nurse, who receives a higher level of training, has higher percentages of tasks in the <u>people</u> and <u>data</u> categories than does the nurse aide. The nurse aide has a higher percentage of tasks in the <u>things</u> category than does the practical nurse.

Further investigation of these data revealed that of the 83 items meeting the criteria for the nurse aide, all but seven also met the criteria for the practical nurse. Thus, nearly all the tasks commonly assigned to the nurse aide and performed by her were also assigned to and performed by the practical nurse. The practical nurse's tasks include most of these performed by the nurse aide, but are extended to encompass some patient treatment and data collection.

TABLE VI

The Percentage of Tasks Performed According to the Categories of People, Data, and Things

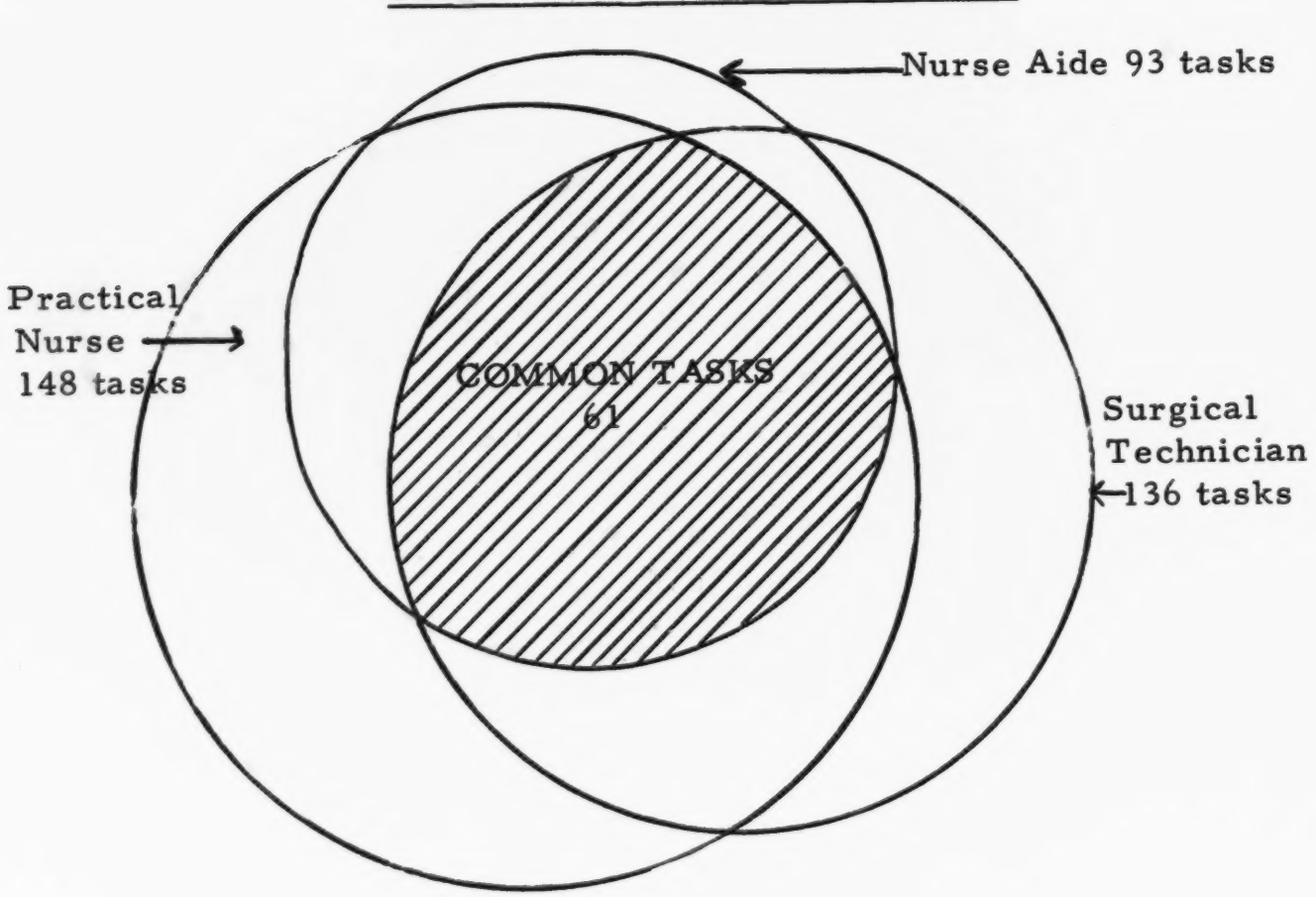
	Licensed Practical Nurse Tasks (N = 107)	Nurse Aide Tasks (N = 83)
People	53%	46%
Data	27%	19%
Things	20%	35%

Commonalities

From the tasks reported as functions of their jobs by no less than 50 per cent of the workers or their supervisors, a pool of tasks common to all three paramedical occupations was specified. These common tasks which constitute the trainee's end-of-program behaviors and beginning-of-job behaviors provided the basis for specifying the educational objectives. The core curriculum was constructed by these. (Appendix G)

Results: From the total number of tasks considered functions of the nurse aide, surgical technician, and practical nurse, 61 were found to be basically common to the three paramedical professions. (Appendix H) As shown in the schematic representation below, approximately two-thirds of the nurse aide tasks are common to all three occupations. An even larger commonality exists between practical nurse and nurse aide. Surgical technician shows the greatest degree of specialization and consequently a lesser overlap with the other two occupations.

SCHEMATIC REPRESENTATION



The attitudes, knowledge, and skills were then specified for the tasks common to the three occupations required for the satisfactory performance of each task. For defining levels of performance required in the domain of attitudes, or affective domain, Krathwohl, Bloom, and Masia's Taxonomy of Educational Objectives (17) were employed. Thus, as examined according to Bloom's classification, attitudes were within this range of objectives: interest, values, appreciation and adjustment. The required behavior in attitude was then established according to Bloom's levels of characterization: receiving, responding, valuing, organization and complete control.

For specifying categories of behavior, Gagne's schema was followed to determine the level of capability necessary for performing the particular behavior. Each task was categorized into one of six levels according to Gagne's definitions. The six levels are hierarchial in nature ranging from simple to complex, with each level dependent upon the preceding levels. This hierarchy of behaviors is described by Gagne (9) as having the following appearance:

The learning of

Problem Solving and Strategy-Using
require the pre-learning of:
Principles
which require the pre-learning of:
Concepts
which require the pre-learning of:
Associations
which require the pre-learning of:
Chains
which require the pre-learning of:
Identifications
which require the pre-learning of:
Responses

No educational guide was employed for defining levels of performance in the domain of skills, since the skills to be mastered were of the elemental type. Skills, as defined for this research project, are techniques acquired in regular programs of training, and denote competence in applying the specific techniques.

Evaluation and analysis of the 61 common tasks according to Bloom's three main classifications, i.e., the classifications of knowledge, skill and attitude, resulted in the tasks being grouped

into those three specific categories. Those tasks grouped by area of knowledge are listed in Appendix I; those by area of skills are in Appendix J; and those by area of attitudes are in Appendix K.

In applying Gagne's analysis to the knowledge tasks in order to define the level necessary for task performance, it was found that most of them fall into the category of identification. Of the six categories of desired behavior, 29 tasks are in identification; the next largest number, 20, are in the class called use of a concept. The full distribution of tasks are given in Table VII below.

TABLE VII

The Distribution of Tasks in the Six Classes of Desired Behavior in the Cognitive Domain:

Class of behavior characteristics		Number of Tasks
1	(simple connection)	0
2	(chain or sequence)	9
3	(identification)	29
4	(use of a concept)	20
5	(recognition of a principle)	3
6	(higher order principle)	0

In using another of Bloom's techniques on the common tasks so that the desired level of behavior in attitudes might be defined, it was established that the majority of the tasks fell into the level of valuing. Altogether, 34 tasks were in this level, with the next largest number, 13, in the level of complete control. The distribution in Bloom's five levels are given in Table VIII below.

TABLE VIII

The Distribution of Tasks in the Five Levels of Behavior in Attitudes, as Based on Bloom's Classification:

Level of characterization		Number of Tasks
1	(level of receiving)	0
2	(level of responding)	8
3	(level of valuing)	34
4	(level of organization)	6
5	(level of complete control)	13

PHASE III

Studying Characteristics

of the

Paramedical Student Body

METHOD

Student characteristics that might affect success in training programs or on-the-job performances were examined. Data available on students who had entered three Board of Education programs during the past two years were analyzed. Made available for such analyses were the mean intelligence quotient, reading level, chronological age, highest grade completed, and marital status of each enrollee of the surgical technician, practical nurse, and nurse aide program.

Other data was obtained from permanent record cards, interview schedules and letters of application to try to ascertain the general economic level of candidates for training in the three selected occupations.

In the effort to determine other important student characteristics, follow-up letters were mailed to graduates of the programs in which regular follow-ups are not conducted by the Pennsylvania State Employment Service. These data, along with similar data supplied by the State Employment Service, were then analyzed to gain information as to the vertical and horizontal mobility of the graduates, the length of time the graduates remain in the field for which they were trained, and the geographic distribution of the students.

As Krumboltz (18) has pointed out, once the student's characteristics are known, the nature of the initial teaching program that will meet the objectives can be specified. Estimation of possible outcomes in terms of the student's achievement level and time requirements can be made, as well as can be an estimate of the total time required for the program.

Results

Figures pertaining to student characteristics, which might affect success in training programs or on-the-job performance, indicate slight variations among typical enrollees of the three Board of Education courses. Of the students who had entered the program during the previous two years (1965-1966), only the practical nurses had completed their high school education; approximately three-fifths of the nurse aides had completed eleventh grade, and nearly all the surgical technicians had completed their twelfth grade schooling. Other figures showed that the mean of ages for the three groups ranged from 28.8 for the practical nurse, to 23 for surgical technician, with the 26.3 mean age for the nurse aide falling between. The mean intelligence quotient was well within normal range for all three groups, as measured by the results of the Otis Gamma I.Q. tests which were administered to each student upon his enrollment in the courses. Table IX provides in full the figures on student characteristics.

TABLE IX

Student Characteristics

Mean	Practical Nurses (242)	Nurse Aides (523)	Surgical Technicians (193)
Otis I.Q.	102 (N=237)	91.8 (N=502)	105 (N=175)
Reading Level	9.82 (N=233)	9.93 (N=211)	11.19 (N=161)
Age	28.8 (N=241)	26.31 (N=518)	23 (N=125)
Highest Grade Completed	12 (N=242)	11.05 (N=323)	11.97 (N=183)
Marital Status			
Single	131	303	125
Married	95	187	38
Divorced	6	1	0
Separated	6	18	0
Widowed	4	10	0
Unknown	0	4	20

From interviews, schedules and letters of application it was established that approximately 50 per cent of the candidates for the nurse aide and surgical technicians were on public assistance. Corresponding figures on the practical nursing students were not available, since such information is not required in state-funded programs; it was estimated, however, by those closely associated with the program, such as the instructors, that a large percentage of the practical nursing students also are from the culturally disadvantaged group.

PHASE IV

Orienting the Health Institute Instructors

to the

Concept of a Flexible Educational System

METHOD

It was recognized that a critical variable in contributing to the measurable results of the demonstriation program was the quality of instruction that would be employed. To some extent, as Krumboltz (18) has pointed out, "this variable concerns the degree to which the content and method of teaching is structured or organized so that it is easily acquired by the student." But it also involves, as he emphasized, "the process of communication in the instruction--the adequacy with which facts, concepts, and skills are explained or otherwise imparted to the student."

Mainly in an effort to orient instructors to the training philosophy behind the adopted curriculum rationale and to acquaint them with the demonstration curriculum's basic pillars of activity-oriented, job-related materials and immediate reinforcement in learning, it was decided to conduct a series of in-service instructor seminars. It was hoped that the proper attitudes and methods required of instructors, who would train the students, would be imparted by such indoctrination. To try to improve on teachers' competencies through in-service seminars was considered a necessary part of the dynamic and flexible educational system being attempted in this research project. Beck and Saxe have noted that: "In-service education of teachers is recognized as one of the most important supports to a vital, functional educational program." (18)

In preparation, the research staff first made a tentative outline of how the seminars should be organized. This included decisions as to when, where, and how to conduct the seminar sessions, by whom, the type of presentations to be used, and who besides the instructors should be invited to attend. The choice of the seminar speakers also was based upon their qualifications to (1) guide the conference in the direction it should go, (2) encourage the conferees to do some of the talking and thinking, and (3) draw out discussion of important points.

The staff them compiled a list of recognized community leaders. To help give due emphasis to the importance of the seminars, each of these key speakers was introduced by a member of the professional community prominent in health service activities. This was done in a series of five in-service seminars attended by 40 persons and conducted on four successive Saturdays.

These were the five topics chosen for presentation. (Appendix L)

Curriculum Philosophy and How to Develop a Curriculum Rationale

The Writing, Evaluation and Implications of Educational Objectives

The Sociology of the Student Body

Principles of Learning (Theories, Methods, and Techniques)

Principles of Learning (Audio Visual Aids)

The discussion of these topics was considered of consequence to the instructors' understanding of the type of demonstration program they would shortly be required to teach. As propounded by Tyler, "Unless the objectives are clearly understood by each teacher, unless he is familiar with the kinds of learning experiences that can be used to attain these objectives, and unless he is able to guide the activities of students so that they will get these experiences, the educational program will not be an effective instrument..." (33)

Accordingly, at the first session, a specialist in the field of curriculum development presented fundamental principles and methodology for developing curriculum rationale and then instructed the group in the practice of developing rationales.

At the second session, on the following Saturday, the methods of evaluating educational objectives were discussed as were the values of stating those objectives and their implications to both teacher and student. Again, practical work-shop experience was provided by the speaker and allowed the participants to have supervised experience in the writing of such objectives.

Primarily stressed in the third session was the difference in the value systems of middle-class society and that of the lower socio-economic stratum, and the ways in which these differences affect student needs, psychologically and educationally. Presented by the speaker were the problem-centered case analyses. Small discussion groups were formed after the lecture to allow for a free verbal exchange on the need for precise incentives and immediate rewards in training the culturally disadvantaged.

The final session was conducted in two parts--a morning program which was based on the Principles of Learning, its Theories, Methods, and Techniques; and an afternoon program, which centered upon the development, application, and best use of teaching aids. A specialist in each field gave the two different lectures.

All of the five sessions were structured along these general lines: lecture by an authority, with illustration of material by visual aids; question-answer session; workshop groups for discussion of the topic covered.

Toward the end of the final session, a two-page questionnaire was distributed to those in attendance as a means of evaluating the benefits of, and reactions to the in-service seminar. (See Appendix M) The recipients were instructed to fill in the questionnaires and return them before leaving.

Results: In the effort to determine the reaction to the five workshop sessions, a two-page questionnaire was distributed the last day of the in-service session to the conferees. All 17 multiple choices were checked by all the respondents, but the three-question survey appended was not filled in by a majority of the respondents.

From the essay part of the questionnaire, it was learned that those responding considered the Theories section of the Principles of Learning lecture "particularly well covered" as well as the topic thay would be "most useful" to them in their classrooms. Next in rating such approval was the Assessment of Student Environment in the Sociology of Student Body lecture. The results from the essay part of the questionnaire are presented below:

> Appended to the list of seventeen choices was a three-question survey, which was not filled in by a majority of those attending the workshops and which, in the main, elicited these opinions:
>
> I. Aspects of the workshop considered "particularly well covered":
>
> (1) Principles of Learning
> (a) Theories and (b) Methods and Techniques
>
> (2) Sociology of the Student Body
> (a) Assessment of Student Environment
> (b) Assessment of Student Attitudes

II. The division of Methods and Techniques in Principles of Learning was "inadequately covered" in the opinion of five.

III. Principles of Learning and Sociology of the Student Body were considered the topics that would be "most useful" information for use in their own classroom.

Through the multiple choice part of the questionnaire, the respondents' positive and negative reactions to specific aspects of the workshop was ascertained. For instance, 96.1 per cent felt that the workshop was worth the time and effort it required, and the same high percentage believed that most new teachers in their fields could profit by attending workshops similar to this one. In another mutliple choice, 55.6 per cent felt that more time should be devoted to covering the material of the workshop. The specific percentage for each of the 17 questions is presented in Appendix N.

PHASE V

Developing the Demonstration Curriculum

METHOD

When the data cited was analyzed and compiled by the research staff, the findings were submitted for review and recommendation to acknowledged authorities in the health service field. In addition, members of the research staff were assigned the study of various publications which pertained to health training in the three areas under inspection as well as closely to allied areas. It was possible to derive from the data, after its review and implementation, verified job entry behaviors for the three selected occupations. Having been established, these job entry behaviors provided the base necessary for building educational objectives.

With the job entry behaviors determined and verified, the research then centered upon a wider, more intense examination of pertinent literature in the education field and in the health service field. This included staff review of books, articles, theses, and project reports. Also, letters were written to medical associations, to similar programs, and to producers of educational materials. Interviews were held with experts in the use of educational media.

From these cumulative efforts a deeper knowledge was gained of four consequential areas: trends in the field, student characteristics, the psychology of education, and the philosophy of education. With the adaptations imposed by the relevant elements of these four areas, and from an overall study of the job entry behaviors specifications, tentative training objectives were derived. Skills, knowledge and attitudes required to meet the training objectives were specified.

With the theory in mind that training is narrow in scope and involves only learning that which is directly related to job experience, (27) the research staff made a study of a conventional curriculum currently in use. The purpose was to determine whether aspects of the curriculum could be adapted to a base of activity-oriented learning, with the clinical heavily emphasized and integrated with the theoretical. The study revealed that in the conventional curriculum two weeks were allotted to conditioning the students to their new status as trainees in a health service occupation. This two-week period was called the Occupational-Diagnostic Phase (O-D Phase). During it, trainees were provided with remedial reading and arithmetic, and schooled in such topics as cleanliness, personal grooming, and proper diet.

Based upon previously detailed investigations, the decision was made to eliminate the O-D Phase from the training for the experimental course. With the trainees of the type described as

those who are present-oriented and who value manual skills and are concerned with immediate gratification, the O-D Phase appeared not essential to the training program. Support for this view is given in two of the seven points advocated by Pearl and Riessman (27) for teaching those on the lower socioeconomic level: (1) continuous on-the-job training and almost immediate initiation to work and (2) an activity rather than a lecture approach ("do rather than write") with emphasis on role-playing and role-training.

Additional support for the elimination of such an O-D Phase is to be found in Watson's theory of learning that "genuine participation increases motivation, adaptability and speed of learning". (34) Finally, several of the instructors considered the O-D Phase extraneous, since the tasks to be learned by the students were mainly simple mechanical tasks which require minimal theoretical knowledge for their performance, and a two-weeks classroom situation as such was unrelated in principle and practice to the ultimate work situation.

With preliminary findings indicating that there could be developed for para-medical occupations a curriculum which would reduce training time, it was elected to demonstrate the curriculum rationale in a pilot program for training nurse aides.

In designing and correlating the pilot program, the research staff developed unit quizzes, examinations, worksheets, progress records, daily lesson plans and an overall schedule. The quizzes were given in class, graded immediately by the students themselves, and then discussed in class with the instructors. (Appendix O) Of the three examinations which were given at specified times during the six-weeks course, each was a test of the students' comprehension of the material in which they had been instructed in the immediately preceding period. (Appendix P) Some of the worksheets were developed for units where maximum transfer could be expected, i.e., for those units where the type of information to be supplied by the student on the worksheet would be supplied in the conditions similar to actual on-the-job performance, such as in the nurse aide's computations of a patient's Intake and Output. (Appendix Q) In the progress records, the more detailed skills to be mastered were listed and, when successfully performed by the student, were checked in his presence by the instructor. (Appendix R) The daily lesson plans designed by the research staff were provided the instructors well in advance of the day for which each lesson was scheduled. The lesson plans specified the objectives, visual aids to be used, homework assignments, form of evaluation and the type of presentation (roleplay, demonstration, group discussion, lecture, supervised clinical work). See Appendix S.

In addition, the research staff screened a variety of visual aids to implement classroom instruction. After selection, the filmstrips, films, and transparencies -- all in areas relating specifically to basic care of the patient -- were integrated into the program.

Films were first chosen from the catalogue lists of recognized health service and educational organizations, and then previewed by the research staff. Those films geared to the nurse aide level and with appropriate instructional material were selected and then arranged by subject matter to be incorporated into the curriculum. In the use of filmstrips, twelve areas of basic patient care were emphasized. These included admission and discharge of the patient, and hand washing. In some cases a repeated showing of a filmstrip was provided the students after their laboratory or clinical experience in the training procedure. In transparencies, the research staff prepared special material in such areas as record keeping and hospital organization.

Outlined in the overall schedule, which was intended for use by the instructors as a master plan, was the sequence of lessons, visual aids, worksheets, tests, quizzes, and homework assignments. (Appendix T) Altogether the curriculum was designed to have maximum appeal for the designated type of student in training and increase the probability of their success. The materials were sequenced to proceed from the simple to the relatively complex. The clinical was emphasized and carefully integrated with the theoretical. Quizzes, progress records and teacher evaluations of clinic performance were scheduled to allow frequent indications of the trainees' level of performance.

A major undertaking of the research staff, in the preparatory stages of the curriculum, was the development of a Nurse Aide Handbook. The 172-page handbook was written and edited in step-by-step procedures of basic nursing procedures, including instructions for the performance of tasks which were designated by the staff's job analysis survey as those most often performed by nurse aides in area institutions. About one hundred and fifty illustrations were used. This handbook, titled Basic Care of the Patient, was provided the instructors and the trainees for use as a textbook during the six-weeks course.

The instructors were asked to make critical notations in the handbook as they used it whenever they thought the material ought to be enlarged, changed, omitted or in any other way revised to meet the learning needs of the students.

At the end of the six-weeks course, the research staff met with the instructors individually and in personal conferences discussed the handbook page by page in light of the changes suggested. When all the points of change had been discussed and compiled, the handbook was revised. The revisions were based mainly upon the constructive criticisms of the instructors and included the addition of new chapters and occasional artwork, some deletions, an enlarged foreword, an expanded table of contents, and the addition of an index.

From the typical job-behavior information requested of supervisors, the research staff compiled a number of true incident cases reported as having been encountered by nurse aides in area institutions. The supervisors had submitted these true incidents in essay style. With names deleted, thirty of the incidents were edited and then assembled as a booklet tiled True Cases of Nurse Aid Techniques. This was an application of a principle of learning advocated by the National League for Nursing, i.e., that problem solving and reflective thinking must be emphasized for effective learning. The League states: "Life and work are full of situations requiring good judgment, thinking, and problem solving." (24) The booklet was constructed to be distributed to graduates of the experimental curriculum after they had been initiated to their routine tasks as practicing nurse aides and had been on their jobs for approximately two months. (Appendix U)

PHASE VI

Evaluating the Experimental Curriculum

METHOD

Sample: For the demonstration program, two training classes comprised of two sections each constituted the sample used. Each trainee was recruited in the customary manner by the Pennsylvania State Employment Service and was assigned at random to one of four classes in two area hospitals. Twenty-three enrolled in the conventional training course, which began June 6, 1967. Of these, nine dropped out. Thirty enrolled in the experimental training course, which began July 16, 1967. Of these, eight dropped out.

The conventional course was the usual eight-weeks training course with final evaluation by written examination scheduled for the eighth week. The control groups, divided into two classes of six and eight students, took this conventional course. The experimental groups, consisting of two classes of eleven students each, used the six week experimental curriculum and took the newly developed examination at the end of the sixth week.

Otis Gamma I. Q. tests were administered to the students when they enrolled. All groups were predominantly composed of young single Negro females, age about 24, who had not quite completed their high school education, whose mean Intelligence Quotient was 92. 5, and whose reading level was at about the eleventh grade. These figures compare with the following figures obtained from permanent record cards of graduates of the nurse aide program for the two previous years: young single Negro females, age about 26, with a mean I. Q. of 91. 8 and a reading level at about the tenth grade. The figures are specified according to groups on Table X on the following page.

As a sampling of nurse aide graduates of local training programs, it was found that the students in the control and experimental groups were quite representative. Further, like the majority of other such students, they for the most part were of the lower socioeconomic order, with the majority receiving financial support through public assistance funds.

TABLE X

Mean I. Q. 's

Hospitals	Control	Experimental
Hospital No. 1	99.83 Range 89 - 124	88.45 Range 77 - 104
Hospital No. 2	88.50 Range 79 - 100	93.51 Range 77 - 110

Presented below is the characteristic composition of the four groups who completed the training courses:

	CONTROL		EXPERIMENTAL	
	Hospital 1	Hospital 2	Hospital 1	Hospital 2
Total in class - 6	8		11	11
Youth	3	6	1	2
Adult	3	2	10	9
Married	1	2	2	1
Single	2	5	6	8
Divorced	1	-	1	1
Separated	2	1	2	1
Average Age	26	22	24	25

Evaluation Instruments:

For the purpose of evaluating the effectiveness of the nurse aide demonstration program, four different quantitative measurements were developed. These were: performance tests, three written examinations, student-on-the-job evaluations, and supervisor on-the-job evaluations. In addition, the instructors applied their personal judgments as to whether or not the students were sufficiently trained at the end of six weeks to begin nurse aide work.

Throughout the experimental course, the research staff conferred regularly with the instructors and occasionally sat in on classes to hear portions of the lectures. This contact was considered necessary in order to get the benefit of the instructors' comments and opinions about the experimental curriculum as well as to observe their use of the material and the trainees' general reaction to the curriculum techniques.

The performance tests consisted of simulated on-the-job performances of selected nurse aide procedures, and were administered to the trainees of both the control and experimental groups toward the end of their respective training periods, i.e., in the eighth week of training for the control groups, and in the sixth week for the experimental groups. The tests allowed for the assessment and comparision of the two different training techniques in terms of the trainees' level of actual performance. Registered nurses who had no knowledge of the nature of the demonstration experiment were selected to be impartial observers. Supplied with checklists which contained the most essential steps in the performance of each task, the nurse observers were requested to check whether or not the student being observed performed each step listed during her execution of the procedure. (Appendix V) The procedures were carried out in a simulated hospital setting with members of the research staff playing the roles of patients. Authenticity of environment was supplemented by the students' use of actual medical supplies and by the students being required to record all relevant data (temperature, pulse, respirations, etc.) on the authentic hospital data form.

Included in the first part of the performance tests were the unobserved performances of two fundamental clinical tests (urine reduction and acetest) and two fundamental calculations (Intake and Output), with the students being given clinical specimens and actual clinical testing materials. In this portion of the evaluation, the students were required to work without observation and to enter their results on authentic clinical reports. The reports then were collected by the members of the research staff.

Three major written examination units, each covering the course material presented in the immediately preceding period, were developed by the research staff and administered by the instructors at specified times, beginning approximately two weeks after the curriculum was initiated. These were the commonly employed type examinations, having the format of true-false statements, multiple choice, identifications, and completion.

Next, a modification of the initial job-survey was applied by the research staff. For this phase, the task performance checklist which was developed included all but the least performed tasks reported on the initial survey. This modified survey provided for the reporting of those tasks which were taught to the students in training and/or performed by the students in their actual work experience.

The research staff conducted these on-the-job evaluations for both the control and experimental groups after all four groups had been on the job an equal length of time. This was done from a dual viewpoint -- that of the graduate trainees and that of their charge nurses. After placement in an area institution and a two months' orientation in which they actually performed on the job, the graduate trainees were requested to fill out the evaluation forms.

A staff member first carefully went over the brief written instructions with the nurse aide to make certain the instructions were clearly understood. The nurse aide was required to denote by a check-mark apposite each task listed on the eight-page form: 1) if the task had been taught her during her training course and 2) if the task was being performed by her in her present work. In case she was performing tasks which were not listed on the form, she was to write the natures of those tasks in the space provided. (Appendix W)

This form was filled out in the presence of a staff member who, upon its completion, went over each of the pages with the nurse aide to insure unintentional omissions. An attempt was made to get the graduate's general estimation of the curriculum by asking her, in a casual tone, whether she thought the training course had sufficiently prepared her for the nurse aide work she was doing and what suggestions she might have for improving the program.

A much shorter job-evaluation form was provided the charge nurses. It was a one-page behavioral rating scale which required that the charge nurse rate the competence of the nurse aide in certain areas of work simply by encircling a number. The numbers were the weights assigned to competencies from 1 (inadequate) to 9 (Superior). See Appendix X.

Results: On Performance Tests, the experimental groups had a significantly higher mean than had the control groups. Out of a possible 70 points, the combined mean for the experimental groups was 62.73; for the control groups it was 52.57. The superiority of the experimental groups was further indicated by the fact that no person in the control groups has as high a score as the mean score of the experimental groups. There was a low negative correlation (-.08) between I.Q. and performance on the test scores.

In all ten sub-areas of the performance test, differences in the percentages of correct responses between the experimental and control groups of both hospitals were found consistently higher in the experimental groups than in the control groups. In two techniques, the experimental groups at both hospitals achieved a high proficiency level of 97 per cent in handwashing. This compared with 64 per cent, or an unacceptable level of proficiency, for the control group at Hospital No. 1 and with 73 per cent at Hospital No. 2. In the technique of taking respiration, at Hospital No. 1 the experimental group's 91 per cent compared with the control group's 78 per cent. At Hospital No. 2, the perfect score of 100 per cent compared with the control group's 70 per cent, or minimal acceptable level of proficiency. The one other 100 per cent score of an experimental group was in admission and discharge, at Hospital No. 2. This compared with the control group's unacceptable level of proficiency at 58 per cent. The specific percentages are presented in Table XI, on the following page.

TABLE XI

Observed Clinical Performance Tests Results Reported in

Percentage of Correct Responses

	Hospital No. 1		Hospital No. 2	
	Control	Exp.	Control	Exp.
Admission and Discharge	87%	89%	58%	100%
Temperature	68%	84%	82%	89%
Pulse	86%	94%	81%	86%
Respiration	78%	91%	70%	100%
Bedmaking	71%	84%	55%	83%
Elimination (Providing the bedpan)	61%	84%	40%	67%
Elimination (Removing the bedpan)	62%	84%	61%	77%
Handwashing	64%	97%	73%	97%
Hot Water Bottle	77%	89%	81%	93%
Emptying the Urinary Collection Bag	83%	90%	63%	90%

In the Clinitest - Acetest and Intake - Output tests, the correct responses for the experimental group were well above the level of proficiency in four cases, at an acceptable level in one instance, and unaccountably low in three cases. In two of the same three test areas, the control group also was below the accepted level of proficiency. A possibility was that the students had not been taught the fine discriminations required for performing the task. Another possibility is that since these were unobserved tests, there may have been unrecognized exchanges of answers among students. Since only one student in one experimental group agreed with the answer given by an instructor who provided the specimen for clinitest, it is suggested that in this test, the

judgement of the staff member in charge may have been in error. The results are detailed in Table XII below.

TABLE XII

Unobserved Performance Test Results Reported in Percentage of Correct Responses

	Hospital No. 1		Hospital Nc. 2	
	Control	Exp.	Control	Exp.
Clinitest	75%	9%	67%	27%
Acetest	83%	73%	75%	91%
Intake	33%	14%	50%	82%
Output	50%	82%	50%	91%

Student average scores on the three written examinations of the experimental curriculum were consistently high. At Hospital No. 1 the mean score was 90.63. At Hospital No. 2, the mean score was 88.5. Out of a possible score of 100, the lowest score registered by an individual was 77. A correlation of .71 was obtained between I.Q. scores and the experimental finals, which probably indicates that this is an area in which verbal ability is a significant factor.

On-the-job evaluations by the trainee graduates of the experimental curriculum were these: Within the two months that the trainees of the experimental groups had been on the job, only three of the tasks on the checklist had not been performed by any of the nurse aides. In contrast to this, 71 per cent of the tasks were reported to have been performed by more than one half of the graduate trainees. All the tasks performed by less than one half of the nurse aides were found to be of the type normally performed during the day shift and would not fall within the routine assignments for nurse aides on the night shift. At the time of this survey, 38% of the trainee graduates had been on night shift since the beginning of their nurse aide employment.

On-the-job evaluations of the trainee graduates by the registered nurses who were their supervisors showed no significant differences among the four groups as evaluated on the nine-point behavioral rating scale. For this phase of the project, significant results were not anticipated, since job performance rating is determined by many variables other than training, such as the interaction of personalities.

The mean scores for the two groups are presented in Table XIII below. It will be noted that five of the seven means were higher for the experimental groups than for the control groups. None of the differences, however, was statistically significant.

TABLE XIII

Supervisors' Mean Ratings of Nurse Aides' On-the-Job Behaviors

Behavior	Control	Experimental
Meeting Patient's Physical Needs	5.85	6.27
Meeting Patient's Emotional Needs	4.69	5.18
Performing Housekeeping Tasks	6.15	6.27
Reporting and Recording	6.23	5.73
Showing Initiative	5.77	5.73
Assuming Responsibility	5.62	5.91
Maintaining Satisfactory Interpersonal Relations	5.77	6.36

The teacher evaluations resulted in a sharp split* as to whether or not the trainees were adequately trained at the suggested six weeks termination date. At Hospital No. 1, the two instructors refused to terminate any of the trainees, saying that none was sufficiently trained in the two procedures of taking temperature-pulse-respiration, and administering enemas. At Hospital No. 2, the four instructors reported all the students sufficiently trained in all the taught procedures to be placed in nurse aide work at the end of the six weeks.

In spite of shortening and concentrating training, the experimental curriculum did not increase dropouts. The dropout rate in the experimental groups was 27 per cent; in the control groups, it was 39 per cent.

* An administrative difficulty in the project was the encountering of a marked bias against any reduction in curriculum.

CONCLUSIONS AND RECOMMENDATIONS

A major conclusion which may be drawn from this research effort is that faster training can be achieved at least in one area and most probably in other areas of the paramedical field without loss in the quality of training. Since this was not a purely theoretical study but a demonstration program launched in a context of testing and demonstrating a dynamic and flexible educational system, its base of a comprehensive curriculum rationale is one, it is hoped, from which others may be adapted. Further demonstrations of the methodology utilized in this project seem indicated for a complete evaluation of the rationale refinement of the techniques which have been initiated and used. However, applying this rationale, or a similar one, to such other para-medical training areas as practical nurse or operating room technician appears within reasonable bounds, since in this project there were no operational obstacles to indicate that like methods could not be applied in like situations. That the rationale for curriculum development was tested and demonstrated in a training course which produced nurse aides who were judged acceptable for job placement at the end of an abbreviated course of six weeks, tends to point to a basic worth in rationale which should be further explored. It perhaps is also to be considered whether the curriculum for nurse aides, as revised, might be appropriate for other nurse aide training programs. If the entire curriculum is not appropriate for such inclusion, use might be made of some of the tested materials or methods.

It is a reasonable conclusion that the program was successful in reducing the training time and producing performances equal to or better than matched groups.

These results suggest that the model for curriculum construction is suitable as a basic design from which other paramedical training programs may be developed. It is believed that to achieve the same gains, the model must be followed in all its major aspects: job analyses, to determine tasks actually performed on the job; study of trainee characteristics, to determine the training methods needed; in-service seminars, to maximize the quality of instruction; and multiple evaluations to ascertain the effectiveness of the training.

The job analyses appears to be the most objective and most effective way to arrive at job descriptions for purposes of curriculum building. It eliminates personal biases and individual preferences which often are caused by the specific job procedures of an institution. The emphasis on task performance is believed to have been

vital in reducing the time required for training nurse aides by 25 per cent without any reduction in the effectiveness of training, as measured by performance tests.

Another factor believed to have been significant in the program success is the focus on trainee characteristics and the subsequent choice of methods and materials appropriate to activity-oriented trainees of the type who value manual skills and like immediate gratification. They responded well to the methods and materials which had been chosen to motivate them.

In-service instructor seminars for training programs of this nature are essential inasmuch as teaching involves continual refinements of approach which must be adapted to the specific program. The use of visual aids, for instance, needs careful explaining to instructors if the aids are to be successfully integrated into a curriculum. It appears that the best evaluative tool for demonstration programs of this type is performance tests. Since "an individual learns that which he does", (20) performance has the added importance of serving as a strong teaching aid. On-the-job evaluations by the nurse aides indicate whether or not the curriculum adequately prepared the trainees for their work. They also serve as a guide for possible curriculum revisions.

The commonalities among the three para-medical occupations studied were found to warrant the development of a tentative core curriculum. This core may well serve as a format for a general introductory course in at least the three fields investigated. As such, the first two weeks of the curriculum constitute the first two weeks of a general para-medical course. This introductory training would allow students a chance to acquire a knowledge basic to all three occupations before they make their occupational choice. After the two-week period, students who chose to become surgical technicians would move into the surgical technician program. Those in nurse aide or in practical nurse training could continue together in the common program for an additional month, at which time those qualifying for practical nurse training could be enrolled in the practical nurse program.

This would be a departure from the traditional training programs in that trainees are not immediately locked into a specific course. Here they would be given an opportunity to move into related training courses without having to start training afresh.

Although the research team is convinced that equal if not superior results were obtained with a 25 per cent reduction in training time, acceptance of this premise was less than unanimous among supervisors, practitioners, and even among trainers in the

field. In too many instances, quality is equated with time and energy -- "We should spend more time training - not less". This phenomena may raise formidable barriers in the future if the concept is transferred to other Health-Oriented occupations -- especially those requiring licensure or certification as a condition for employment.

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